

REMARKS

FIG. 7 has been corrected by deleting reference numeral "315" and replacing it with new reference numeral "395". The deleted reference numeral "315" was a draftsman's mistake. Support for the correction is found in the specification at page 20, lines 16 – 19.

Support in the specification for new dependent claim 68 is found at: page 18, lines 10 – 15.

Amended independent claim 38 includes the new limitation of a supplemental hydrogen barrier layer material being adjacent to the primary hydrogen barrier layer material. Support for this limitation is found in the specification at page 5, lines 7 – 9; page 9, lines 2 – 4; page 17, lines 7 – 9; page 20, lines 16 – 20; and claim 27.

Claim Rejections Under 35 USC §102

Claims 1 – 4, 11, 12, 19 – 22, 28 – 30, and 36 were rejected under 35 USC 102 (e) as being anticipated by Kanaya, U.S. Patent Application Publication No. U.S. 2002/0038402 A1, published March 28, 2002 (hereafter "Kanaya").

Kanaya teaches a hydrogen barrier film 402 made from material selected from the group consisting of Al_xO_y represented by Al_2O_3 , $\text{Al}_x\text{Si}_y\text{O}_z$, TiO_x , ZrO_x , MgO_x , and MgTiO_x . See Kanaya, page 12, paragraph [0196].

Independent claim 1 of the present application has been amended to limit hydrogen barrier layer material to a group consisting of: strontium tantalate, bismuth tantalate, and tantalum oxide. Kanaya does not teach a hydrogen barrier comprising strontium tantalate, bismuth tantalate, or tantalum oxide. Therefore, Kanaya does not teach an important limitation of amended claim 1.

Amended claim 1 incorporates a limitation of originally filed dependent claim 9, which has been canceled. Claim 9 was rejected under 35 USC 103, and is discussed below.

Pending claims 2 – 8, 10 – 18, and 20 – 27 depend from independent claim 1. Therefore, these claims are also not anticipated by Kanaya.

Amended independent claim 28 now includes the limitation that the hydrogen barrier layer comprises an amorphous hydrogen barrier layer material selected from the group

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consisting of: strontium tantalate, bismuth tantalate, and tantalum oxide. Kanaya does not teach a hydrogen barrier comprising strontium tantalate, bismuth tantalate, or tantalum oxide. Therefore, Kanaya does not teach an important limitation of amended claim 28.

Pending claims 29 – 37 depend from independent claim 28. Therefore, these claims are also not anticipated by Kanaya.

Claims 38 – 44 and 46 were rejected under 35 USC 102 (e) as being anticipated by Amanuma, U.S. Patent No. 6,188,098 B1, issued February 13, 2001 (hereafter "Amanuma").

Amended independent claim 38 essentially contains the limitations of a hydrogen barrier layer comprising a primary hydrogen barrier layer material and a supplemental hydrogen barrier layer material; the primary and supplemental materials being different from each other; the primary and supplemental materials being either both conducting or both insulating; and the primary hydrogen barrier layer and the supplemental hydrogen barrier layer both inhibit diffusion of hydrogen to the metal oxide material from essentially the same direction over the majority of the length of the shortest one of the primary hydrogen barrier layer and the supplemental hydrogen barrier layer.

In other words, a hydrogen barrier layer in accordance with claim 38 is functionally a single barrier layer with multiple layers. In contrast, Amanuma teaches a plurality of hydrogen barrier layers 7, 11, 12, and which are distinct and separate. Further, when two layers in Amanuma are both nonconductive or both conductive, Amanuma does not teach that the two separate layers comprise different materials. For example, at Amanuma, column 6, first hydrogen barrier film 7 and non-adjacent hydrogen barrier film 12 are both nonconductive and comprise the same material, namely, Si_3N_4 . As another example, in FIG. 11 of Amanuma, hydrogen barrier layer 11 and hydrogen barrier layer 12 are adjacent in the sense of claim 38 of the present invention, but hydrogen barrier 11 is conducting, while hydrogen barrier 12 is insulating (nonconductive). The specification specifically describes multiple layer barrier 227 comprising supplemental hydrogen barrier layer 229 and primary barrier layer 230 at page 17, lines 7 – 9, with reference to FIG. 4. The specification further describes multiple layer hydrogen barrier layer 391 including primary

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barrier layer 395 and supplemental barrier layer 393 at page 20, lines 16 – 20, with reference to FIG. 7. The relatively long phrase “the primary hydrogen barrier layer and the supplemental hydrogen barrier layer both inhibit diffusion of hydrogen to the metal oxide material from essentially the same direction over the majority of the length of the shortest one of the primary hydrogen barrier layer and the supplemental hydrogen barrier layer” defines the multiple barrier layer as described. This phrase also prevents claim 38 from accidentally reading on Amanuma in the small places where different barrier layers, essentially intended to protect the metal oxide from hydrogen diffusion from different directions, slightly overlap.

Therefore, Amanuma does not teach the same structure as claimed in amended independent claim 38 of the present invention, and therefore does not anticipate claim 38. Claims 39 – 46 and claim 68 depend from independent claim 38. Therefore, these claims are also not anticipated by Amanuma.

Claim Rejections Under 35 USC §103

Claims 5 – 8, 13, 17, 18, 23 – 27, 31, 35, and 37 were rejected under 35 USC 103(a) as being unpatentable over Kanaya in view of Amanuma.

These claims are all dependent claims. None of the limitations of the dependent claims as filed have been incorporated into amended independent claims 1 and 28. Amended independent claims 1 and 28 both include the limitation that the hydrogen barrier layer comprises a material selected from strontium tantalate, bismuth tantalate, and tantalum oxide. Neither Kanaya nor Amanuma teaches a hydrogen barrier layer comprising strontium tantalate, bismuth tantalate, or tantalum oxide. Therefore, the suggested combination of Kanaya and Amanuma does not teach an important limitation of amended independent claims 1 and 28. Claims 5 – 8, 13, 17, 18, and 23 – 27 depend from amended independent claim 1. Claims 31, 35, and 37 depend from amended independent claim 28. Therefore, these dependent claims are not obvious over Kanaya in view of Amanuma.

Claims 9 and 10 were rejected under 35 USC 103(a) as being unpatentable over Kanaya in view of Amanuma and further in view of Shimada et al., U.S. Patent No.

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6,351,004 B1, issued February 26, 2002 (hereafter "Shimada et al.").

Amended claim 1 incorporates a limitation of originally filed dependent claim 9, which has been canceled. Dependent claim 10 depended from claim 9. As a result, the Examiner's reasons for rejecting canceled claim 9 are relevant for discussion.

Shimada et al. teaches a second insulating layer 8, a material such as SiO₂, SrTa₂O₆, SeO₂, or SrTiO₃. See Shimada et al., column 4, lines 61 and 62. Shimada et al. further explains that it is preferable to choose a material of high permittivity such as SrTa₂O₆ or SrTiO₃, or a nonoxide material such as SiN for the second insulating layer 8. See Shimada et al., column 5, lines 2 – 5. Shimada et al. does not teach using SrTa₂O₆ as a hydrogen diffusion barrier. At the time of filing of this application, SrTa₂O₆ was known in the art as a dielectric or insulating material, as used in Shimada et al., but not as a hydrogen barrier layer. There is no suggestion or motivation in the references cited by the Examiner to combine the references as suggested by the Examiner to use SrTa₂O₆ as a hydrogen barrier. That is, neither the references that discuss hydrogen barrier layers nor the reference that discusses SrTa₂O₆ suggest that SrTa₂O₆ can be used as a hydrogen barrier layer. MPEP 2142 and MPEP 2143 – 2143.03. Canceled claim 9 and amended claim 1 include the limitation that the barrier layer is located in inhibit the diffusion of hydrogen to the metal oxide. The SrTa₂O₆ layer in Shimada et al. is deposited before the metal oxide and is located several layers below the metal oxide. In this location, it cannot inhibit diffusion of hydrogen to the metal oxide. Thus, an important limitation is missing from the references and there is no *prima facie* case of obviousness. All of the limitations of a claim must be considered when weighing the differences between the claimed invention and the prior art in determining obviousness. MPEP 2116.01 and 2143.03.

Therefore, amended independent claims 1 and 28 are not obvious over Kanaya in view of Amanuma and Shimada et al. The other claims are dependent on either claim 1 or 28 and are therefore not obvious either.

For the above reasons, claims 1 – 8, 10 – 18, 20 – 46, and 68 as amended are believed to be patentable and their reconsideration and allowance is respectfully requested. It is believed no fee is due. If any fees are due, the Commissioner is

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authorized to charge them to Deposit Account No. 50-1848.

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